THE JOURNAL OF THE FLORIDA MEDICAL ASSOCIATION
PUBLISHED MONTHLY
Volume VIII St. Augustine and Jacksonville, Florida, February, 1922 Number 8

ORIGINAL ARTICLES

THE PHYSIOLOGICAL BASIS OF RADIUM THERAPY.*

GERRY R. HOLDEN, M. D., F. A. C. S.,
Jacksonville, Fla.

The pyhsiological basis for radium therapy lies in the reactions which take place in the living organism as a result of exposure to the rays emitted from a preparation of radium.

Without accurate knowledge of these reactions and the laws which govern them, scientific practice of radium therapy is impossible. Moreover, on account of the ever-increasing importance of this branch of therapeutics, a certain familiarity with its fundamental principles must be part of the general knowledge of every well-informed practitioner.

THE REACTIONS CAUSED BY RADIUM.

The reactions which may occur after exposure to radium are of three varieties: First, local changes in the tissues; second, alterations in glandular functions; third, alterations in the metabolism of the organism as a whole. The local tissue change may either be of the individual cells themselves, or of the part as a whole.

Although it is possible to obtain a caustic effect upon living tissues by exposing them to radium radiation, such a gross death of tissue is not of the greatest value in this therapy, neither is it in any way an effect peculiar to such radiation.

LOCAL REACTION.

The characteristic local reaction of radium consists in the alterations of the individual cells and tissue elements of the parts. It is essentially microscopic in nature, oftentimes occurring with little or no gross evidence of reaction. It can only be understood by carefully studying the series of changes which may take place in a part after its exposure to the active rays.

The first effect which may be noted after such exposure is that of stimulation and irritation of the part, beginning within a day or two after exposure, and gradually increasing in intensity. The area of application may be visibly reddened and congested. Microscopically, the capillaries are dilated. There is an infiltration of serum into the tissues, together with an invasion of leucocytes and small, round cells.

This irritation, provided the radiation has been of sufficient intensity, may go on to an acute inflammatory process and terminate in necrosis of the tissue as a whole. This caustic effect is not as a rule desirable, and dosage is usually so calculated that such results are not obtained.

With the dosage insufficient to cause gross death of tissue an acute inflammatory condition is not reached, and the congestive process slowly subsides. The microscopical picture during the first week or so shows nothing different from the ordinary picture of acute congestion. At the end of this time, however, certain changes in the epithelial cells of the part begin to make their appearance. The cells enlarge, and the protoplasm presents a beginning vacuolation. The nuclear figures become marked, hyperchromatosis appears, and the nucleus enlarges. Both nucleus and protoplasm begin to degenerate in from two to three

*Read before the forty-eighth annual meeting of The Florida Medical Association, at Pensacola, May 10-11, 1921.

weeks after exposure. The invasion of small, round cells and polynuclear leucocytes become marked and the detritus from the broken down cells is carried off by phagocytosis.

Accompanying these changes in the epithelial cells, there are certain important changes taking place in the connective tissue elements. There is an apparent stimulation of the connective tissue cells, with formation of fibro-blasts and new connective tissue. In two or three months after radiation we may find the spaces formerly occupied by epithelial cells filled by this new formation of connective tissue. In the course of time this tissue becomes dense. Fairly well supplied with blood vessels at first, these later disappear, and there is finally formed a sclerotic mass of dense, fibrous tissue, a characteristic result of radium radiation.

Another characteristic result is seen in the changes which take place in the blood vessels. At first there is a congestion. The capillaries and small blood vessels are dilated and engorged with blood, and there is an exudation of serum in the tissues. In a week or ten days after exposure the vessel walls themselves show a leucocytic infiltration of the wall. The intima is swollen and thickened. Endarteritis and endophlebitis result, leaving finally a reduction of the lumen in the larger vessels and an obliteration of smaller vessels and capillaries.

These changes in the blood vessels are important factors in causing the dense sclerotic conditions found in tissues after radiations.

EFFECTS ON GLANDS.

The second variety of reaction caused by radium exposure, alterations in glandular functions, results from degenerative changes of the epithelial cells of the gland itself.

In this process of degeneration we have the same series of microscopic changes taking place as we described under local effects of radium rays. In the ovary, for example, after exposure to a lethal dosage, we have first the congestion and swelling of the tissues, followed by the death and disappearance of the epithelial cells, with connective tissue growing in to occupy the space; and finally in a few months the ovary is reduced to a firm, fibrous mass with no vestige of ovarian epithelium left. As a natural result, the physiological action of the glandular cells is lost.

GENERAL EFFECTS.

Changes which radiation causes in the physical economy of the body as a whole are most interesting from the scientific standpoint, and very significant from the standpoint of practical therapeutics. A great deal of work remains to be done on these points, and from the results of these studies valuable therapeutic help will undoubtedly be obtained.

We will mention but a few of these reactions. Changes in the blood are the most frequent and striking of these phenomena. Diminution in the white corpuscles is a constant feature when sufficient radiation has been given. This takes place not only when the percentage is greatly increased in pathological conditions, but is also seen in the blood of normal individuals exposed to its radiation. This may be caused not only by one or two massive doses, but also by frequent short exposures to the effects of the rays. Reduction in the hemoglobin and red cells is frequently found, especially after repeated exposures to small amounts of radium. Blood pressure is reduced by radiation, far more in proportion when it is abnormally high, but also to a certain extent in the normal person.

Radium is a general depressant of the nervous and circulatory systems when given in large dosage. In the majority of cases of massive radiation we have this evidenced by a marked asthenia and depression. Acidosis is said to be a result of even moderate radiation, causing nausea, oftentimes most extreme.

GENERAL PRINCIPLES OF RADIUM THERAPY.

Such then, briefly stated, are the most important effects which may be caused by exposure of the living organism to the radium rays. In discussing them with reference to their practical bearing on radiotherapy, we shall devote more time to the first variety, the local effects caused by the ray. Upon this effect of the radium ray depends the majority of the work with which the average man is familiar as radium therapy.

In describing the effect of radium on the epithelial cells, nothing was said as to whether the cell under consideration was normal or pathological. As a matter of fact, there is no difference, theoretically, in its action upon the normal or pathological cells. It will kill either of them if it is given in strong enough dosage. But, broadly speaking, the cancer cell is more easily killed than the normal cell. While conversely, radiation which is a lethal dose for the cancer cell may do no harm to the normal epithelial cell.

There is also a great difference in the sensitiveness to radiation of various normal cells. Skin is more resistant than the mucous membrane of the mouth, while the mucous membrane of the bladder and rectum is more sensitive than either. The vagina is more resistant even than the skin, fortunately for the urgencies of our technique in uterine cancer.

Pathological conditions also may be graded as to their sensitiveness to radiation, and such studies are most important in selection of cases, dosage, and prognosis.

We now see why it is possible to give a dosage which will kill the cancer cells lying in a certain organ without destroying the normal cellular matrix in which these cells are lying, even though both pathological and normal cells may be killed.

The varying resistance of tumors and tissues is a subject concerning which we have a certain amount of knowledge, but on which a vast amount of work still needs to be done. A general principle which is of great value is the so-called law of Bergonie and Tribondeau, first given out by them in 1905 with reference to the action of the roentgen rays on the living cell, but applying equally well to the penetrating rays of radium. This law states that immature cells and cells in an active state of division are more sensitive to radiation than are cells which have already acquired their fixed adult morphological or physiological habits. A rapidly growing carcinoma or sarcoma, therefore, containing cells of an embryonic type, in a state of rapid subdivision, is much more sensitive than are the adult cells of the matrix in which such tumors lie. It does seem at first thought as if there must be a peculiar selective action when we consider how vast cancer masses may melt away in a few weeks, leaving practically a normal surface behind, with no injury to any tissue other than the pathological tissue. But we know now that increased dosage would attack the normal tissue just as certainly as it has the pathological. To argue a selective activity is therefore unnecessary and against the facts.

Upon the varying resistance of tissues, both normal and pathological, depends the question of dosage, or the amount of radiation given to a certain area. Two errors may be made here, either that of giving too much, or, what may be even worse, giving too little. Over-dosage gives a lethal dose to the tumor, but it may also kill the normal tissue matrix in which the tumor lies and a terrible condition arises therefrom. Insufficient dosage, however, may be even worse than over-dosage, because its effect is that of stimulation. As was said above, the initial effect of radiation is always a stimulation. It is shown as a mechanical irritation, accompanied by an increased blood supply to the part and an increase in cellular growth. When a therapeutic radiation has been given, this stimulation is succeeded at once by cell inhibition, and the temporary stimulation is of no harm. If the dosage is so small that we do not get a lethal effect upon the cells,

we may have no cell inhibition at all, and the only effect that of initial stimulation. In the case of rapidly growing inoperable cancer, it is evident what deleterious results an insufficient dose would give.

The time at which the various microscopical changes take place is of practical importance. The first evidences of cell death appear about a week or ten days after lethal radiations. It is a week or two later before the cells are disintegrating and their debris being carried off by phagocytes, while the new formation of connective tissue does not reach a quiescent stage of sclerosis for several months later. Results, therefore, from radium therapy are not immediate. A certain period of time must elapse before any visible result can be noted, while from two to three months are required before the height of the effect can possibly be expected. It is of great importance that these facts be understood, not only by patients undergoing treatment but by the profession at large.

The initial stage of congestion is also of significance. It must be realized that in glandular radiation, as in cases of menorrhagia, or exopthalmic goitre, the conditions may be worse temporarily after radiation. Also the initial period of congestion is of importance in considering the combination of radium therapy and operation. If radium is employed before operation, then the operation should be so timed that it will not take place at the height of congestion. In other words, if not done within forty-eight hours after radiation, it should be postponed until ten days or two weeks afterward, or until the initial congestion has subsided.

The formation of connective tissue, mentioned as a characteristic end result of radium exposure, also has an important bearing on the question of operation. If operation be delayed too long it is made more dangerous and difficult on account of this dense fibrous transformation.

The formation of connective tissue, together with the reduction in the blood supply, undoubtedly is of therapeutic value in certain cases. In some cases, cervical cancers are apparently cured when we feel that it was impossible for all the outlying cancer cells to have received a lethal dose of radiation. Also, in examining specimens removed at periods after radiation the following microscopic picture has been found: cancer cells, not dead but apparently in a state of inhibition, lying as little islets surrounded by areas of sclerotic, connective tissue almost destitute of blood vessels. Apparently these cells were injured by radiation, though not killed; with their source of nourishment depleted on account of the impoverished blood supply they lay dormant in the bed of dense connective tissue. Initial injury, followed by impoverishment in blood supply.

When we consider the practical application of the effects which radiation produces on glandular function and upon the general body economy, we take up a wholly new field of radium therapy, and a field in which lie some of the great future triumphs of this branch.

However, inasmuch as this subject is in a most formative stage, we will in this paper mention but a few of the more important applications and hint at some of the other possibilities.

When we are considering the therapeutic value of the effects which radium has upon glandular functions, probably the ovary should be mentioned first. The ovaries are peculiarly sensitive to radiation. By graduated doses we can either reduce ovarian activity in the younger woman or cause its entire cessation in the older woman. This can be done easily, with a minimum of pain, discomfort or danger. A whole realm of gynecological conditions has, therefore, been removed from the surgical field.

The ovary was the first gland treated by radium therapy. Recently practical application, with excellent results, have been made in other conditions. Certain forms of

goitre yield readily. It is absolutely the best treatment for persistent thymus gland in children. It is utilized in Hodgkins disease, while radiation over the spleen and ends of the long bones give results in some cases of leucaemia.

I also wish to mention in passing that tuberculous glands, non-suppurative, are no longer in the field of surgical conditions, such uniform satisfaction being given by radiation.

Concerning the utilization of the effects upon the general economy of the body, the reduction of blood pressure, changes in the blood, etc., there is little to say at present. Except in the treatment of leukaemia, those results of radiation have been employed but little in this country, and little scientific work has been done along this line. That use will be made of these striking characteristics in the therapeutics of the future, there can be but little doubt.

Discussion.

DR. H. B. MCEWEN, Pensacola:

Dr. Holden has covered his subject most thoroughly, discussing the microscopic changes taking place after exposure to radium, the effect of radiation on the epithelium, upon blood vessels and cancer tissue, and has covered the subject so nicely that about all there is left to say is, *he has said it.* I might mention the fact that it has been found by biologic experimentation that the lethal cancer dose is approximately 90 per cent of the lethal epithelial dose, this giving us a margin on which to kill the cancer cells without doing permanent damage to the surrounding normal tissue. The action of radium radiation upon the angiomas demonstrates very prettily the action upon the blood vessels, the endarteritis and endophlebitis resulting from the exposure produces the cure, and this may be had without macroscopic reaction. Some writers think that in addition to the hystological changes produced in the tissues by radiation, that there is also a chemic one which it may pay to investigate.

THE TREATMENT OF CUTANEOUS GROWTHS WITH A CONSIDERATION OF RADIUM AND X-RAY THERAPY.*

J. L. KIRBY-SMITH, M. D.,
Jacksonville, Fla.

Gentlemen: In a paper of this scope the time allotted me will not permit the giving of the etiology or histo-pathology of cutaneous growths. It will be my purpose, then, to deal only with the treatment of the common lesions that are found on the skin. Each condition will be considered separately, and the measures that are found by the writer as best suited will be given; also some of the measures recommended by other dermatologists. The following conditions will be considered:

Naevus, the common birthmark (or "port wine" birthmark).
Naevus Pigmentosus, or pigmented mole.
Naevus Angiosum, or angioma.
Small Fibroma, or mole.
Keloid (scar tissue tumor).
Verruca Seborrhoeica, or "scurfy spots."
Verruca Vulgaris, or common warts.
Verruca Planum, or flat warts.
Epithelioma:
- Rodent Ulcer Type.
- Superficial Type.
- Papillary Type.
- Deep-seated Type.

Skin Cancers.

Next in order is a brief description of five measures that are indispensable in the successful treatment of cutaneous growths:

Carbon Dioxid Snow.
High Frequency Spark.
Electrolysis.
X-Ray.
Radium.

No doubt, some of you are familiar with all of these measures. In case you are not, however, it will not be amiss now to consider each.

***Read before the forty-eighth annual meeeting of The Florida Medical Association, at Pensacola, May 10-11, 1921.**

Carbon Dioxid Snow: CO^2 snow is obtained in an ordinary 60 to 100-pound carbonic acid gas cylinder in this manner: The cylinder is placed in a horizontal position, a chamois skin is wrapped and tied securely around the outflow cock, the release valve is unscrewed and the gas allowed to flow, and when the pressure is released the gas solidifies in the chamois skin. This snow is compressed or hammered into the desired shape; or further, may be cut or trimmed to the desired size for an application to the growth which is to be treated.

The freezing is brought about by applying the proper amount of pressure; from 40 to 100 seconds is the time necessary to freeze the growth completely, of course, depending on the size and location of the same. The after treatment is to protect the blister that forms. Aside from the burning sensation immediately following the treatment, no pain is experienced from the freezing operation.

The High Frequency Coil: The high frequency coil will deliver a spark that can be used for dermatological purposes. Using an aluminum point anode, small neoplasms can be destroyed at one sitting. The extent of the destruction of tissue is regulated both by the rheostat on the coil and the distance between the growth and the end of the aluminum point. Special cords and handles are made for the use of this apparatus.

Electrolysis: For this, the requisites are 8 to 10-cell connected battery, with sponge and small steel needle, with holder and cords for same. The sponge end is connected to the positive pole of the battery, and the needle with holder and cord to the negative. The fine needle is thrust through the base of the growth and the current allowed to pass through for a few minutes until the tissue shows blanching. Slight pain is experienced, and if the growth is transfixed in several diameters the lesions will be completely destroyed, leaving a very slight scar.

X-Ray: In using the X-ray for the treatment of cutaneous growths, it is needless to state that a familiarity with this measure is necessary. The success of the treatment is dependent upon one's knowledge of the proper screening and the protection of untreated parts. With an X-ray machine giving a 6-inch spark, with due consideration to distance, milliamperage, time, protection and screening, one can successfully remove, in one to three treatments, most of the cutaneous growths.

Radium: Not less than 10 milligrams of radium element in a flat applicator (full strength) can be used to remove successfully lesions of an epitheliomatous character. As in the use of X-ray, a working knowledge of screening and protecting parts is necessary. Certain rules are laid down by experience as to the time of radium treatment exposures. Simple keratatic spots would require only a few minutes of unscreened radium treatment, while lesions like keloids would require 6 to 8 hours' continuous treatment, repeated on subsequent days to a total of 20 to 24 hours.

Naevus: In the treatment of naevi (especially the ordinary "port wine" birthmark), two things are to be considered: size of the growth and its location. From a cosmetic point of view, the location is the most important consideration, especially when the naevus is situated on the face or uncovered parts. Of all the measures at my hands, CO^2 snow and radium have given the most satisfaction in the removal of this variety, the former giving the best results.

Naevus Angiosum: This type of birthmark (naevus angiosum) is often spoken of as angioma. Freezing with CO^2 snow has given better results in my hands than radium. Especially has this been so in deep-seated cavernous type. The freezing produces slight, if any, destructive action on the outer layer of the skin, while the effect of the freezing, after one or more treatments, gradually produces the closure of the mass of blood vessels in the angioma, and very shortly is noticed a decrease in the size of the tumor and a disappearance of the

purplish or reddish discoloration of the skin. The only objectionable feature of this treatment is the formation of a large blister or bulla, which occasionally may be carelessly or accidentally ruptured by the patient or the nurse, with slight superficial scarring resulting. But, all in all, this scarring would be less than that produced by heavy radium treatment insufficiently screened.

The Kromayer quartz lamp has been used with good results.

Naevus Pigmentosum: Naevus pigmentosum, or pigmented mole, is the most common type of naevi seen. When they occur on the face or on the uncovered parts of the body, we are oftentimes called upon to remove these unsightly lesions. Up until a few years ago the technique for treating these growths was in such a poor state of development that patients preferred to leave them untreated. For this reason, and also that some people were led to believe that this particular type of growth was a progenitor of a malignant cancer, naturally they deferred a visit to a physician for the removal of these disfiguring marks. I have seen several cancers develop from repeated applications of strong acids or other caustics for the removal of these growths. In some locations, unquestionably surgical is the method of election for the removal of this type of pigmented mole which has frequently been irritated and has been subject to trauma. For a number of years the writer has had the opportunity of treating successfully this type of naevus with CO^2 snow; also having used the fulguration with an aluminum point from a high frequency current. In the past few years, however, X-ray, or radium, have given better results, both cosmetically and permanently.

Small Fibroma: Under the heading of fibroma will be placed that type of small, fleshy growths which are at times hard and fibrous tumors. They are frequently found on the face and other parts of the body. These growths are often spoken of as moles. When existing on covered parts of the body which are not subject to irritation, they produce no objective or subjective symptoms that would bring the patient to the doctor, but on the face they produce a picture which is oftentimes spoken of as "unsightly moles." In the small pedunculated type, a removal is easily accomplished by electrolysis. A fine epilating needle attached to the negative pole of the battery is passed through the pedicle, and a few moments of a 10-celled current is sufficient to destroy the growth completely. When these lesions are of large size, electrolysis is not practical, but the application of a spark from a high frequency coil, using an aluminum point, at one sitting completely destroys the growth. In the case of a nervous patient, it is necessary to inject, beforehand, at the base of the growth, by a small hypodermic needle, a drop or so of novocain solution.

Keloid: The red and, at times, painful outgrowth from a scar is spoken of as the keloid. These growths, until recent years, have baffled the medical profession. An excision will be promptly followed by a return of the growth. At the present time the lesion is successfully treated with radium and to an equal extent with X-ray, well filtered and full dose.

Verruca Seborrhoeica: Under this name, no doubt, this condition is unfamiliar to you, but using the more common name, "scurfy spots," you will see where I am driving. This disease is known under several names. For instance, "old-age hardening of the skin," "scurfy spots," keratosis, seborrhoeica and sebaceous warts. Unquestionably, this type of cutaneous growth is most commonly met in middle age and elderly people, especially those who spend most of their time in the open. Exposed parts—the face, the neck and hands—are the most frequent places for the development of these growths. In themselves, omitting the cosmetic consideration, these lesions are of considerable importance. Especially is this true in the appearance of a sebaceous wart in the bearded region of a man who is

continually shaving over these parts. It is prone to develop into a superficial type of an epithelioma, due to continuous irritation.

For the treatment of verruca seborrhoeica, both radium and X-ray are the best measures. The latter is especially applicable in the occurrence of a number of these warty growths. One or more X-ray treatments, given in two weeks' time, just short of an erythema dose, will cause a prompt disappearance of these unsightly and uncomfortable lesions. For a number of years the use of tricloracetic acid, preceded by a slight curettement, produced good results. A few minutes' exposure with a moderate amount of radium, unfiltered, will promptly clear up a sebaceous wart.

Verruca Vulgaris: The treatment of common warts has no doubt baffled some of you doctors in your practice. After trying all of the simple measures, *i. e.*, caustics, scissors, karotolytic plasters, and after the "conjure" treatment, you gave it up as a "bad job." But, if the proper consideration were given this growth, you would realize that the treatment of a wart for a successful removal is not so simple as you would think. To get rid of a wart, the growth has to be thoroughly destroyed, and in destroying a wart you cannot do this by simply paring off the horny part and applying some acid to destroy it. You have to go further. The best and most rapid measure, at the writer's hands, has been by the high frequency fulguration. This measure will completely destroy the wart at one sitting. A nervous patient would require the injection of a local anaesthetic. In the occurrence of a number of large warts, covering part of the hands, for instance, both X-ray and radium give good results. From two to three weeks' time will be required for the disappearance of these warts.

Verruca Planum (Flat Wart): Occasionally you meet with this wart occurring over an extensive surface, sometimes on the backs of the hands and on the face, the latter location being very unsightly. Occasionally, the internal administration of full doses of arsenic will cause a prompt disappearance of the growths. Local treatment of this variety of wart is best obtained by X-ray, giving two treatments at intervals, screening so that an erythema is avoided.

Epithelioma: The treatment of skin cancers has resolved itself into two successful measures, from the standpoint of a dermatologist. In the first type mentioned, rodent ulcer, recurrences are often seen, but by applying radium or X-ray so that considerable tissue beyond the margins of the ulcer are rayed, recurrences are less apt to occur. This type of skin cancer is one so often seen developing around the base of a "scurfy spot." Unquestionably, any number have been cured by such simple measures as curettement, and caustics, and the use of cancer pastes. But both the X-ray and radium cause the rodent ulcer to heal rapidly, with slight scarring and with little or no discomfort to the patient.

The superficial type of epithelioma often develops from a pre-existing scar or an irritated mole or wart, making its presence known by a growth with a pearly-like border, at times a slight crateriform ulcer with scabbing, a tendency to bleed and some discomfort to the patient. This type of skin cancer, when early seen and at some locations, is to be removed with ease, with cosmetic results, by any number of measures, any of which, if applied properly to cause complete destruction of the growth, is generally sufficient. No doubt, most of you recognize an epithelioma of this type and will recommend prompt excision as the choice of election. But, I assure you, the treatment of elderly patients by surgical operation, even though hardly to be considered an operation, defers many an elderly patient from seeking medical advice for the beginning of a skin cancer. When these superficial epithelioma occur on the nose or around the eye, radium is the remedy *par excellence.* When occurring on other parts of the face

or body, a full dose of X-ray, properly administered, will produce beautiful results.

For the papillary type of skin cancer a surgical excision is the proper procedure, but, as in the foregoing type, oftentimes the patient refuses such measure. Unquestionably, the papillary type is more prone to malignancy than the other two. Neighboring lymphatic glands are more early involved. As in the other varieties, X-ray or radium give the best results.

The following questions are often asked: Which of the two measures, radium or X-ray, is preferable for the treatment of cutaneous growths? What is the difference, if any, in these two? When to use one and when the other? From the writer's point of view, both are indispensable. The effect of radium and X-ray on a cutaneous growth is identical; both destroy the growth of a neoplasm by disintegrating the cellular elements. I am of the opinion that X-ray has a more selective affinity for abnormal tissue elements. In other words, that an application of an X-ray treatment to a growth of a cancerous character destroys the cancer cells, and the neighboring healthy tissue is uninvolved by the treatment. Unquestionably, the use of radium, as applied by the use of a flat applicator, is more easily used around the face than X-ray. Especially is this true of cancerous growth forming around the eyes.

Now, in these days of enlightenment, one rarely sees extensive and destructive skin cancers, while, in the past, it was not at all uncommon to see skin cancers of the rodent ulcer type having existed for years, with extensive destruction of tissue and resulting mutilation. For years the medical profession has endeavored to educate the public in regard to the early relief of suspicious growths of the embryonic type. And, unquestionably, the general public is throwing off the superstitions attending the treatment of new growths, and does not hesitate to seek medical advice for these conditions, while, as hereinbefore mentioned, one formerly delayed and only sought relief when he suffered pain and mutilation from an extensive cancer.

The removal of an early growth is a prophylaxis against cancers. We all agree to this, but as to the method of selection the surgeon has the disadvantage in that the inherent fear of the patient of elderly type produces delay, which results in extension of the growth. Therefore, fear and ignorance ought to be eradicated, and this by education and early removal of a growth that is subject to irritation. From my point of view, dermatology offers an easy and prompt method.

CONSANGUINEOUS MARRIAGES.

F. J. Walter, M. D.,
San Diego, Calif.

Since very early times the question of kinship in marriage has been discussed, but one will find comparatively little written upon the subject within very recent years. In England objection to such marriages has not been so strong as in America. In the United States we find the feeling against cousin marriage quite strong, and in thirty states* marriage between first cousins is prohibited, and in four of these states, Ohio, Indiana, Nevada and Washington, the prohibition is extended to first cousins once removed. If there is reasoned objection and harm results from such marriages we should

*Note—Marriage between first cousins is forbidden in all the states except Alabama, California, Colorado, Connecticut, Delaware, District of Columbia, Georgia, Hawaii, Idaho, Kentucky, Maine, Massachusetts, New Mexico, New York, North Carolina, Rhode Island, South Carolina, Texas, Virginia and between step-relatives except in Alaska, Arizona, Arkansas, Delaware, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maryland, Minnesota, Nebraska, Nevada, New Mexico, New York, Ohio, Oregon, Tennessee, Utah and Wisconsin.

have strict and uniform laws in all the states, and, if none can be found, why legislate at all?

The following harmful results are frequently selected by the opponents of consanguineous marriages: (1) Marked decrease in fertility. (2) A high infant mortality. (3) The occurrence of deaf-mutism, insanity, albinism, harelip and some deformities.

If these harmful results can be proven we most certainly should have legislation in all the states regulating kinship marriages. It would seem that in some of our states legislators have taken it for granted, or at least the safe thing to do, to regulate such marriages.

No article on marriages of kinship can be complete without reference to Mendel's law.† A close study of this law is most interesting. It may also be of interest to quote from an address by Dr. Crzellitzer, in the Medical Society of Berlin, December 29, 1914, on "The Biological Effects of the Marriage of Blood Relatives." He says: "After several generations there appeared diminution of strength, constitution, smaller, more slender, more sensitive, lacking in constitutional vigor, and fertility fails at last. Latent diseases in the parent may become awakened in consanguineous marriages more than the public at large. In a person of mixed heredity a disposition which we call recessive may remain latent for decades, but come to light on pairing with another organism of the same tendency. Thus the Mendelian law gives the key to some obscure problems of the ages."

In *Munchener Medizinische Wochenschrift,* April 8, ILX, No. 13, pp. 681-736, Kanngiesser's investigation as regards offspring in large numbers of marriages of blood relations compared with others:

Mental weakness.. 4 %		
Impaired vision ..0.5 %	No relation.	
Deaf-mutism 0.01%		
Mental weakness..9.4 %		
Impaired vision ..3.1 %	Consanguineous marriages.	
Deaf-mutism .....1.9 %		

In the interests of this article I wrote the Medical Superintendents of about twenty of the most prominent state insane institutions in the United States the following letter:

MY DEAR DOCTOR—I am preparing a paper on the marriage of first cousins and consanguineous marriages in general. Have you an opinion, in general, resulting from your observation, of the mental defects resulting from such marriages? I would greatly value anything that you might have to contribute and proper credit will be given. Do you believe that all the states should legislate against such marriages?

The replies, in the order received, are as follows:

Sonomo State Home, Elridge, Calif., July 25, 1921. —My dear Doctor: In reply to your communication of the 19th instant relative to the marriage of first cousins and consanguineous marriages. My personal opinion and observation is that the offspring of first cousins are usually defective, and if they do marry they should not reproduce, for we have many cases in this institution of this type. Of course, there are cases on record where the offspring of cousins are of average mentality, but I am quite sure it is the exception and not the rule. We also have inmates who are offspring of brother and sister as well as children whose father is the grandfather of the child, and in one instance where the father is the great grandfather of the child. These cases are usually of very low mentality.

Trusting this will cover the information desired, I am, very truly yours, F. O. Butler, Medical Superintendent.

†Mendel's law, Mendelian law; the law that the offspring is not intermediate in type between its parents, but the type of one or other parent is predominant. If two well-defined varieties of the same species be cross-fertilized, the resulting hybrid offspring will show the distinguishing characteristics of one of the parents only, this inherited characteristic being termed *dominant.* The characteristic of the other parent, however, known as *recessive,* is latent and will appear in the next generation bred from the hybrid. The offspring from this second generation will be of two kinds, three-quarters of the offspring having the dominant characteristic and one-quarter of them the recessive characteristic. If two of these recessive numbers of the third generation are bred together, the subsequent generation will show constantly the recessive character. As regards the dominant members of the third generation, they divide themselves into two orders: one-third of these members produce purely dominant offspring; the other two-thirds are purely hybrids showing a mixed character and each subsequent generation from them shows the same proportion of pure dominants, pure recessives and hybrids. This law may be expressed by the following formula: $n(DD+2DR+RR)$ in which *DD* represents pure dominant offspring; *RR* pure recessive offspring, *DR* hybrid offspring and *n* the number of the generation.

Agnew State Hospital, Agnew, Calif., August 4, 1921.—My dear Doctor: In reply to yours of recent date, I cannot give you any statistical information from our records in regard to consanguinity as a factor in producing insanity. The data given us in the commitment of patients does not cover this point and our records do not show it. My own opinion and observation do not lead me to place great importance upon this factor, unless there is repeated intermarriage. I am sorry I cannot give you some data of real value. Very truly yours, Leonard Stocking, Medical Superintendent.

State of New York, Gowanda State Homeopathic Hospital, Collins, N. Y.—My dear Doctor: In reply to your letter regarding consanguineous marriages, I would say that, in general, our opinion is that these are unwise, especially if there is family heredity and the two parties are alike, since intermarriage would tend to increase and intensify pathological traits. I doubt if legislation would be efficacious. Of course, it is necessary to consider the make-up of the individual, the likeness or unlikeness of the cousins and other factors. We have only a few cases in the hospital whose parents were cousins and in those am unable to offer anything further, I am, very truly yours, C. A. Potter, Superintendent.

The State Hospital for the Insane, Danville, Pa., August 12, 1921.—Dear Dr. Walter: In reply to your communication of August 6th, will say as follows: Our professional opinion in the matter, while in accordance with the law of physical inheritance, is that the qualities of the parents, when alike, are intensified in the offspring and, therefore, the sound mental and physical constitution of two nearly related parents should be transmitted with certainty to the offspring, and if care is exercised in the mating as to the proper balance in the matter of temperament, the results may be in many instances without untoward effect. On the other hand, it should be remembered that parents as closely related as first cousins, although apparently free from physical and mental defect at the time of marriage, are more apt than those not related to become afflicted with like disease during life and transmit a greater tendency to the same to their children. And, furthermore, consanguinity on the part of the parents is likely to bring together the subjects of similar neurotic taints, which will unquestionably be reinforced in the offspring. It would, therefore, seem that while marriage between first cousins may at times be consummated with safety to the offspring, on the whole it is a procedure not devoid of danger and is better avoided. Pennsylvania, among many other states, recognizes the danger of such matings and regulates the practice by law. Respectfully yours, J. Allen Jackson, M. D., Superintendent.

Harrisburg State Hospital, Harrisburg, Pa., August 12, 1921.—Dear Doctor Walter: I am in receipt of your letter of August 6th and would say that we have no figures bearing on the question of consanguineous marriages. I believe the influence of such factors has been overestimated, and see no reason for the passage of additional laws regulating such marriages. Yours very truly, E. M. Green, Superintendent and Physician.

State of New York, Buffalo State Hospital, August 12, 1921.—Dear Doctor: Your letter of August 6th, in reference to the marriage of first cousins, has been received, and in answer the hospital regrets to say that it has no data on the question that can be communicated at the present time. Very truly yours, F. W. Parsons, M. D., Superintendent.

State of New York, Binghamton State Hospital, Binghamton, N. Y., August 12, 1921.—Dear Doctor: Your letter of the 6th inst. is received. In reply I would say that after a professional experience of nearly forty years, I am of the opinion that the marriage of normal persons who are first cousins will not result in mental defect in the offspring. Where such defect manifests itself in the offspring I believe other causes than consanguinity have operated to produce it. I am, very truly yours, Charles G. Wagner, Medical Superintendent.

State Institution, Polk, Pa., August 12, 1921.—Dear Dr. Walter: Answering your inquiry of August 6th. We have no data or statistics indicating that marriage of first cousins in itself is the cause of mental defect. Although we have cases of mental defect in which the parents were first cousins. In most of these cases there is a history of mental defect in one or the other or both branches of the family. Our opinion is that there is no particular danger of mental defect resulting from the marriage of first cousins unless there is evidence of mental defect in the family. I do not believe it a good practice and believe that all states should legislate against such practice. Yours truly, J. M. Murdoch, Superintendent.

State Hospital for the Insane, Norristown, Pa., August 15, 1921.—Dear Doctor: In reply to your questionnaire will state that we have had over twenty-three thousand patients admitted to this hospital. In looking over our histories, I find that questions have always been asked in every case concerning the marriage of the parents—in other words, every history gives the consanguineous close relationship as accurate as can be obtained from the relatives. We believe that marriages of first cousins or too closely related marriages produce mental deficiency (imbeciles, epileptics, feeble-mindedness, etc.). We have one family in which the father and mother are first cousins, and ten of the twelve children resulting from this marriage are in institutions. Two boys and two girls of this family are in this institution. This is an exaggerated family, but we have many families where the fathers and mothers are related. I also know of many private families, not connected with the institution at all, having defective children where the parents are related. I might add that this is a large institution and we have over three thousand patients, and they are constantly coming and going. Much more could be said on this subject, but I hope the above will assist you in preparing your paper. Very truly yours, S. M. Miller, Chief Resident Physician Department for Men.

Kankakee State Hospital, Kankakee, Ill., August 15, 1921.—My dear Doctor: I have your letter of recent date inquiring as to the advisability of the marriage of first cousins and other consangineous marriages. Such marriages are not to be encouraged, looking at them from every standpoint, especially so from the viewpoint of one interested in mental disorders. The chief reason for this is that, should there be an inherited deficiency present in one, the

same tendency is apt to be in the other; therefore, the progeny of such a union will face a double danger of faulty inheritance. I am certainly in favor of laws in every state preventing such marriages. Sincerely yours, Eugene Cohn, M. D., Managing Officer.

Homeopathic State Hospital, Allentown, Pa., September 12, 1921.—Dear Doctor: I regret to state I have no information in a general way from my observation on mental diseases, resulting from such marriages. In my Massachusetts service of seventeen years I can recall only one, or at the most two such cases. The same applies since my coming to this institution in 1912—not more than two. The question has always been in my mind whether the actual marriage of cousins has any material effect, provided both are healthy and have a good hereditary background. Where there is bad hereditary or mental defect in one and particularly both branches of the family, then there will be a large number of mental cases. Personally, I believe in the Darwinian theory: if there is defect in both parents, all the children will show this tendency; if one is normal and the other abnormal, one-half of the children will be normal and the other abnormal. I should be in hearty accord to have all states legislate against the marriage of cousins, but would also add that where there is marked heredity in the family, particularly feeble-mindedness, that this should be equally legislated against. Yours very truly, Henry L. Klopp, Superintendent.

State of New York, Kings Park State Hospital, Kings Park, L. I., N. Y.—Dear Doctor: Replying to your letter of the 6th inst., concerning the marriage of first cousins and consanguineous marriages in general, I would state that as regards the likelihood of mentally defective offspring, such marriages would be more apt to produce such offspring in those cases in which there is a strain of such defectiveness, but not otherwise. It is, however, equally true that in case of families in which there are superior strains instead of defective ones, a strengthening of the superiority might also be expected. I am, therefore, not in favor of legislation intended to further restrict consanguineous marriages, that is beyond the already existing restrictions in the more liberal states. Very sincerely yours, Wm. C. Garvin, M. D., Superintendent.

State of New York, Central Islip State Hospital, Central Islip, L. I., N. Y., August 17, 1921.—Dear Doctor: In reply to your letter of August 6th, my observation leads me to believe that in general consanguineous marriages indicate temperamental or intellectual defects in one or both contracting parties, and I do not believe the relationship *per se* results in mental defects or psychoses in the offspring. However, it stands to reason that the union of abnormal individuals will result in a large proportion of abnormal children. Inbreeding, as is well known, is used to improve the stock of animals, and to develop certain admirable traits; the inbreeding, on the contrary, will result in defective stock, and in general the same rules can be applied to man. I am not in sympathy with legislation along such lines. I do not think that it all touches at the root of defective inheritance, and there are certain racial customs which are too prevalent to be ignored, neither will laws change the customs. Very truly yours, G. A. Smith, M. D., Superintendent.

From these letters it is evident that the majority would advise against marriages of this sort, fearing the undesirable strains rather than hoping for the desirable ones. It is also evident that there is a great diversity of opinion regarding legislation. It would seem that state institutions not using the questionnaire regarding the parents are the ones feeling that there is no great and undesirable end regards feeble-mindedness, while in Dr. S. M. Miller's letter he tells us that in a very large institution the question was asked in all cases and that they believe that marriages of first cousins or too closely related marriages produce mental deficiency (imbeciles, epileptics, feeble-mindedness, etc.).

In a long paper by Ethel M. Elderton, Galton Research Scholar, London, on the "Marriage of First Cousins," published in 1911, I find much valuable detail and the opinion that there is much public opinion against first-cousin marriages in America and, hence, fewer such than in England or even in Ireland under church influence. In a summary of deaf-mutism the author concludes that "there seems little doubt that if there is any deaf-mutism in a stock, a cousin marriage, even when both parties are free from disease, is most dangerous to the offspring." "And in considering the question of healthy or unhealthy stock it is not sufficient that the parents, brothers and sisters of the individual should be sound, but the uncles, aunts, grandparents and cousins must also be taken into account in forming an estimate." Again speaking of haemophilia, this author quotes from the "Treasury of Human Inheritance" in which there is a pedigree of haemophilia, though latent for six generations, was found scattered in collaterals. The lesson is that cousins and collaterals of all grades are of immense importance in diagnosing the eugenic fitness of a given individual. In the case of albinos when a parent is albinotic, 32 per cent of the children are albinotic as against 14 per cent where the parents are not related. The latter from Mr. E. A. Fay's

book, "An Inquiry Into the Marriages of the Deaf in America." Several years ago Sir Arthur Mitchell examined 711 persons of unsound mind in nine counties in Scotland. In 192 cases the parentage was unknown. Of the remainder 98 were the children of consanguineous marriages and 412 of non-consanguineous, *i. e.*, in 18 per cent of them first-cousin marriages. This is a far larger percentage of cousin marriages than among the general population, and tends to show that consanguinity is an important factor in unsoundness of mind.

The question of cousin marriage becomes quite important when we consider two persons quite healthy themselves, but belonging to a stock tainted with some defect. When one or both cousins concerned is a sufferer from some defect, we take it for granted that no one would advise their marriage, but when both of the cousins are quite healthy the real problem of cousin marriages arises. The subject is full of complexities and we have always to deal with latent defects awaiting a chance to become patent. There seems no evidence to show that a diminution of fertility follows necessarily a consanguineous marriage. There seems not enough evidence to answer whether or not absolute sterility results from a marriage of kin except in repeated marriages of this sort. There seems to be some evidence that child mortality is greater in the marriage of kin. There is definite evidence that deaf-mutes, albinos and persons of unsound mind are the result of kin marriages in the opinion of many who have a chance to observe thousands of cases. If this holds for these defects, it may hold for a large range of pathological states. If the offspring are affected and one parent is an albino or a deaf-mute, a consanguineous marriage more than doubles the number of children affected by the abnormality. To quote the Galton Research Scholar: "The real danger in cousin marriages lies not in the existence of patent defects in the stock. Nor can we recommend cousin marriages because the stock has certain patent valuable characteristics. Behind the obviously advantageous quality may exist the rare but latent defect. The danger of cousin marriages lies in the probability that the germ-plasm of each individual contains numerous latent defects, each of which is rare in the community at large, and each of which is of small danger to the individual or the offspring unless the mating is with another individual whose germ-plasm contains one or more of the same latent character."

I ask, why should we not have uniform legislation against the marriages of near kin when, after an examination of the evidence at present obtainable, we find that the bulk of cousin marriages are undesirable? So many of them are undesirable even when the individuals can boast of an apparently healthy and normal ancestry and collateral kinship. The one exception we might make is in the case of the occurrence of some rare quality, which is peculiar to a stock, and which cannot easily be preserved for social profit except by marriage of kin. It is only in such a case that there seems the least justification.

4079 *Hillcrest Drive.*
San Diego, Calif.

THE WEIGHT OF CHILDREN.

WM. W. MACDONNELL, M. D.,
City Health Officer,
Jacksonville, Fla.

Last year the school children of Jacksonville were weighed and measured, and it was found that 59.64 per cent of the white children were underweight and 39.46 per cent of the negro children were underweight.

Thinking that it would be of interest to the physicians of Florida, I am appending the table used, which has the approval of

HEIGHT AND WEIGHT TABLE FOR GIRLS.

Height inches	Age 5 yrs.	Age 6 yrs.	Age 7 yrs.	Age 8 yrs.	Age 9 yrs.	Age 10 yrs.	Age 11 yrs.	Age 12 yrs.	Age 13 yrs.	Age 14 yrs.	Age 15 yrs.	Age 16 yrs.	Age 17 yrs.	Age 18 yrs.
39	34	35	36											
40	36	37	38											
41	38	39	40											
42	40	41	42	43										
43	42	42	43	44										
44	44	45	45	46										
45	46	47	47	48	49									
46	48	48	49	50	51									
47	....	49	50	51	52	53								
48	....	51	52	53	54	55	56							
49	....	53	54	55	56	57	58							
50	....	....	56	57	58	59	60	61						
51	....	....	59	60	61	62	63	64						
52	....	....	62	63	64	65	66	67						
53	....	....	....	66	67	68	68	69	70					
54	....	....	....	68	69	70	71	72	73					
55	....	....	....	....	72	73	74	75	76	77				
56	....	....	....	....	76	77	78	79	80	81				
57	....	....	....	....	....	81	82	83	84	85	86			
58	....	....	....	....	....	85	86	87	88	89	90	91		
59	....	....	....	....	....	89	90	91	93	94	95	96	98	
60	....	....	....	....	....	....	94	95	97	99	100	102	104	106
61	....	....	....	....	....	....	99	101	102	104	106	108	109	111
62	....	....	....	....	....	....	104	106	107	109	111	113	114	115
63	....	....	....	....	....	....	109	111	112	113	115	117	118	119
64	....	....	....	....	....	....	....	115	117	118	119	120	121	122
65	....	....	....	....	....	....	....	117	119	120	122	123	124	125
66	....	....	....	....	....	....	....	119	121	122	124	126	127	128
67	....	....	....	....	....	....	....	....	124	126	127	128	129	130
68	....	....	....	....	....	....	....	....	126	128	130	132	133	134
69	....	....	....	....	....	....	....	....	129	131	133	135	136	137
70	....	....	....	....	....	....	....	....	....	134	136	138	139	140
71	....	....	....	....	....	....	....	....	....	138	140	142	143	144
72	....	....	....	....	....	....	....	....	....	....	145	147	148	149

Prepared by Dr. Thomas D. Wood.

ABOUT WHAT A GIRL SHOULD GAIN EACH MONTH.

5 to 8 years old..... 6 ounces.
8 to 12 years old..... 8 ounces.
12 to 14 years old..... 12 ounces.
14 to 16 years old..... 16 ounces.
16 to 18 years old..... 8 ounces.

Try to do as much better than the average as you can.

Height and weight to be taken in house clothes, without shoes. Weigh on the same day each month. Age the nearest birthday.

HEIGHT AND WEIGHT TABLE FOR BOYS.

Height inches	Age 5 yrs.	Age 6 yrs.	Age 7 yrs.	Age 8 yrs.	Age 9 yrs.	Age 10 yrs.	Age 11 yrs.	Age 12 yrs.	Age 13 yrs.	Age 14 yrs.	Age 15 yrs.	Age 16 yrs.	Age 17 yrs.	Age 18 yrs.
39	35	36	37											
40	37	38	39											
41	39	40	41											
42	41	42	43	44										
43	43	44	45	46										
44	45	46	46	47										
45	47	47	48	48	49									
46	48	49	50	50	51									
47	....	51	52	52	53	54								
48	....	53	54	55	55	56	57							
49	....	55	56	57	58	58	59							
50	....	....	58	59	60	60	61	62						
51	....	....	60	61	62	63	64	65						
52	....	....	62	63	64	65	67	68						
53	....	....	....	66	67	68	69	70	71					
54	....	....	....	69	70	71	72	73	74					
55	....	....	....	....	73	74	75	76	77	78				
56	....	....	....	....	77	78	79	80	81	82				
57	....	....	....	....	....	81	82	83	84	85	86			
58	....	....	....	....	....	84	85	86	87	88	90	91		
59	....	....	....	....	....	87	88	89	90	92	94	96	97	
60	....	....	....	....	....	91	92	93	94	97	99	101	102	
61	....	....	....	....	....	....	95	97	99	102	104	106	108	110
62	....	....	....	....	....	....	100	102	104	106	109	111	113	116
63	....	....	....	....	....	....	105	107	109	111	114	115	117	119
64	....	....	....	....	....	....	....	113	115	117	118	119	120	122
65	....	....	....	....	....	....	....	....	120	122	123	124	125	126
66	....	....	....	....	....	....	....	....	125	126	127	128	129	130
67	....	....	....	....	....	....	....	....	130	131	132	133	134	135
68	....	....	....	....	....	....	....	....	134	135	136	137	138	139
69	....	....	....	....	....	....	....	....	138	139	140	141	142	143
70	....	....	....	....	....	....	....	....	....	142	144	145	146	147
71	....	....	....	....	....	....	....	....	....	147	149	150	151	152
72	....	....	....	....	....	....	....	....	....	152	154	155	156	157
73	....	....	....	....	....	....	....	....	....	157	159	160	161	162
74	....	....	....	....	....	....	....	....	....	162	164	165	166	167
75	....	....	....	....	....	....	....	....	....	....	169	170	171	172
76	....	....	....	....	....	....	....	....	....	....	174	175	176	177

Prepared by Dr. Thomas D. Wood.

ABOUT WHAT A BOY SHOULD GAIN EACH MONTH.

5 to 8 years old..... 6 ounces.
8 to 11 years old..... 8 ounces.
11 to 14 years old..... 12 ounces.
14 to 16 years old..... 8 ounces.
16 to 18 years old..... 4 ounces.

the Children's Bureau of the Interior Department.

Not all underweight children suffer from malnutrition, but it is well to bear in mind some of the more important causes of malnutrition as given by the Assistant Surgeon General of the United States Public Health Service. Ten per cent underweight is to be considered undernourishment. They are:

1. The child does not get sufficient food.

2. He does not get the right kind of food. The appetite is spoiled for simple foods needed for growth, such as milk, cereals and vegetables, by indulgence in candy, sweets, pastries and other indigestible food.

3. He eats irregularly, between meals, spoiling appetite and digestion.

4. He bolts his food, never taking time enough to chew his food properly, but works it down with water.

5. He drinks tea and coffee instead of milk and water.

6. He does not get enough sleep. At 10 or 11 years he does not go to bed until 10 o'clock or after, when he should have been in bed at 8 o'clock, and sleep with windows wide open.

7. The child may suffer with habitual constipation.

8. He gets too much emotional excitement, motion pictures, etc.

9. He plays too hard—too many hours, or in too active and intense manner.

10. He is overworked at school or out; sometimes he has too many lessons or classes outside of school hours.

11. Malnutrition may be aggravated by such things as decayed teeth, enlarged tonsils or adenoids, or the underweight may be the beginning of some serious disease.

12. In places where malaria is present, or hookworm infection prevalent, the condition may be the result of these infections.

In Jacksonville the school children are periodically examined at school, and defects of growth, nutrition and physical condition are brought to the parents' attention. This work has been in progress for ten years, and remedial defects have lessened by about 10 per cent.

The Child Health Organization and the National Tuberculosis Society are arranging a list of health chores to be done by the child so that the health habits taught become automatic. They are: Clean bodies and teeth, plenty of sleep with proper ventilation, a bowel movement every day, and the drinking of milk—a quart a day.

PROPAGANDA FOR REFORM.

AQUAZONE (OXYGEN WATER) NOT ADMITTED TO NEW AND NONOFFICIAL REMEDIES.—Aquazone is stated by the Aquazone Laboratories, Inc., Los Angeles, California, to be a supersaturated solution of oxygen in water, carrying approximately five and one-half times as much dissolved oxygen as ordinary water. In an advertising booklet, it is suggested that Aquazone is of value in the treatment of influenza, pneumonia, typhoid, Bright's disease and kindred disorders. It was also stated therein that in the treatment of fevers it lowers the temperature, and that the administration of three bottles of Aquazone (representing 0.033 gm. 1½ grains—of oxygen) is of value for "preventive and tonic purposes."

The evidence which the Aquazone Laboratories submitted did not show that the effects were other than those which might be obtained from the administration of ordinary potable water. The Council declared Aquazone inadmissible to New and Nonofficial Remedies, because the therapeutic claims made for it were unwarranted, and because its use is irrational for the reason that oxygen given by stomach in this way is of little or no value. (Abstracted from Reports, Council on Pharmacy and Chemistry, 1920, p. 50).

The Journal of The Florida Medical Association

Owned and published by the Florida Medical Association.

Acceptance for mailing at special rate of postage provided for in Section 1103, Act of Congress of October 3, 1917; authorized October 16, 1918.

Published monthly at St. Augustine and Jacksonville. Price $1.50 per year; 15 cents per single number.

Contributions for publication in this journal, whether scientific papers or reports of County Secretaries, should be typewritten.

Address Journal of the Florida Medical Association, St. Augustine, Florida, or 602-603 Consolidated Building, Jacksonville, Fla.

EDITOR.

GRAHAM E. HENSON, M. D.

ASSOCIATE EDITORS

W. P. ADAMSON, M. D. W. W. MACDONELL, M. D.

COLLABORATORS

JOHN S. HELMS, M. D., F. A. C. S., Tampa . . . *Surgery*
JAMES V. FREEMAN, M. D. Jacksonville . . . . *Medicine*
WM M. ROWLETT, M. D., Tampa . . . . . *Gynecology*
JAMES D. LOVE, M. D., Jacksonville . . . . . *Pediatrics*
W. HERBERT ADAMS, M. D., Jacksonville . . . . . *Opthalmology and Otology*
WM. S. MANNING, M. D., F. A. C. S., Jacksonville . . . *Rhinology and Laryngology*
J. L. KIRBY-SMITH, M. D., Jacksonville . . . *Dermatology*
JOHN C. VINSON, M. D., Tampa . . . . . *Urology*
B. L. ARMS, M. D., Jacksonville . *Bacteriology and Pathology*
L. W. CUNNINGHAM, M. D., Jacksonville . . *Roentgenology*

OFFICERS OF THE FLORIDA MEDICAL ASSOCIATION.

S. R. MALLORY KENNEDY, M. D., President . . . *Pensacola*
L. M. ANDERSON, M. D., First Vice-President . . *Lake City*
W. HERBERT ADAMS, M. D., Second Vice-President, *Jacksonville*
J. C. DAVIS, M. D., Third Vice-President . . . . *Quincy*
GRAHAM E. HENSON, M. D., Secretary-Treasurer . *Jacksonville*

EXECUTIVE COMMITTEE.

J. C. VINSON, M. D. . . . . *Tampa*
J. HARRIS PIERPONT, M. D. . . . . *Pensacola*
R. H. MCGINNIS, M. D. . . . . *Jacksonville*

COUNCILLORS.

FIRST DISTRICT—Clarence Hutchinson, M. D., Pensacola . 1923
SECOND DISTRICT—F. Clifton Moor, M. D., Tallahassee . 1924
THIRD DISTRICT—R. M. Harkness, M. D., Lake City . . 1924
FOURTH DISTRICT—Julian E. Gammon, M. D., Jacksonville 1922
FIFTH DISTRICT—H. Cutting Dozier, M. D., Ocala . . 1922
SIXTH DISTRICT—Thomas Truelsen, M. D., Tampa . . 1922
SEVENTH DISTRICT—Calvin D. Christ, M. D., Orlando . 1922
EIGHTH DISTRICT—S. D. Rice, M. D., Gainesville . . 1923
NINTH DISTRICT—C. H. Ryalls, M. D., Delwood . . . 1924
TENTH DISTRICT—R. L. Cline, M. D., Arcadia . . . 1923
ELEVENTH DISTRICT—W. R. Warren, M. D., Key West . 1924

COMMITTEE ON SCIENTIFIC WORK.

GERRY R. HOLDEN, M. D., F. A. C. S. . . . . *Jacksonville*
JOHN S. HELMS, M. D., F. A. C. S. . . . . *Tampa*
JOSEPH N. FOGARTY, M. D. . . . . *St. Augustine*

COMMITTEE ON LEGISLATION AND PUBLIC POLICY.

E. W. WARREN, M. D., Chairman . . . . *Palatka*
JOSEPH Y. PORTER, M. D., ... *Key West*
WILLIAM M. ROWLETT, M. D. . . . . *Tampa*
J. HARRIS PIERPONT, M. D. . . . . *Pensacola*
JAMES D. LOVE, M. D. . . . . *Jacksonville*

PROBLEMS IN THE REHABILITATION OF THE VICTIMS OF WAR.*

E. MCIVOR LAW, M. D., D. D. S.,
Arcadia, Fla.

Medicine and surgery have triumphed; so will rehabilitation. The medical and surgical history of the great world war will some day unfold many of the marvels, aye, miracles that were wrought upon the sick and wounded, when it seemed that survive they could not.

Now we are in the midst of the greatest and most important problems of them all—problems requiring the best medical engineering skill, including all the therapies. The training and proper fitting of these victims of the war for useful positions becomes of utmost importance in the economy of the nation.

This can be done each and every day, and with the same degree of success as the skilled surgeon accomplishes his task.

As the days pass, newer and more perfect methods will be conceived, developed and put into active and successful practice.

Many of these poor unfortunates are forced by the surgical conditions to remain in practically one position for long periods of time, and right here is where a great work can be done.

The work in rehabilitation should and does begin from the moment the patient sufficiently recovers from his injury, operation, etc., "to take notice." I know from daily personal observation in one of the largest army general hospitals, that the work done there was nothing short of marvelous in its conception, scope and accomplishment.

The patient must by some manner or means be kept interested, thus keeping his thoughts away from his infirmities. To this end we must use every means at our command, even devise new ones if we find none at hand to fill the bill. Then when the period of forced confinement is over, we have a

*Read before The Florida Midland Medical Society, at St. Petersburg, October 12, 1921.

clear, clean, cheerful mind ready to enter with full zest into that line of vocational training that will in due season bring about his true rehabilitation.

Man re-made, ready to go out again into the world, "armed *cap-a-pie*" to fight his way to success in the ranks of the great industrial army, ranking even higher as a producer or wage-earner than he did before the war.

Vocational misfits should be carefully guarded against and, if found, corrected at once, for he soon loses ambition and energy, and becomes a laggard.

"There is a future for every man who has the virtue to repent and the energy to atone."

Born free and equal! Not so, except as to law and franchise. There are limitations, mental, moral and physical. These limitations, men of thought and analytic perception and vision cannot fail to recognize. Therefore it becomes a fundamental problem in this great and grand work of rehabilitation that we recognize these limitations.

Too often we see a round peg trying to fit itself into a square hole. Useless effort! And it should be corrected at once, so that in passing up life's broad highway we may see each peg set in its proper hole, be it round, oblong or square. What better means than this can be found to eliminate friction; to produce energy and industry, from which progress must be born?

Many of the fundamental problems have been solved, but there are myriad others that will come up as the wonderful work of rehabilitation goes steadily on. Each one, as it presents, will be thoroughly and carefully solved in such a manner as to stand the test and to meet all requirements.

Technical skill, coupled with "bulldog tenacity" and "horse sense," will eventually conquer.

In the solution of these problems, let our estimate of the unfortunate victims of the war be not based upon what he is now, what he has been, but what he can and will be, by giving him the best medical and surgical treatment, the most thorough and skillful training, the proper placement in the employment best suited to him, and a pleasant environment.

Diagnosis by elimination should be the method pursued, and by which we determine upon the calling best suited to our patients, just as we would do in obscure mental and bodily ailments.

A human being damaged by wounds or disease, or both, in the world war, whose personality demands due consideration: restoration to the normal should be accomplished as quickly and fully as is consistent, using every resource and facility at our command.

The bulk of clinical problems arise from disorders, not disease. Effects of bodily disease are truly baffling, but how simple in comparison with the vast and unknown ramifications of mental illness, disorders of personality, etc. Collateral phenomena are often so grave as to constitute more than one-half the problem. Here the patient must be studied from various viewpoints, and we must take into consideration many things not ordinarily receiving attention.

"If at first you don't succeed," begin all over again; and obstacles that seemed almost beyond the pale of human ingenuity will fade into nothingness, and victory is ours.

Co-operation is the *sine qua non* in achieving the best results, and human conservation is the highest and most important branch. There may be a conflict, so to speak, between ethics and economics; then we must exercise discretion and keen judgment, and in every instance try to do that which is best for the patient.

Critical diagnosis must be used to unearth contributory disorders and lesions.

Rehabilitations of the victims of the war is by no manner or means a one-man's job. New problems present at every turn, collateral derangements may loom up, and if not recognized and carefully looked after will result in other derangements which may evolve into structural degeneration.

To restore to full normal is to bring up to par, not only the original status but to develop those innate faculties that have never before been used. This must be done in full accord with biogenic design.

A human being out of repair is closely analogous to a musical instrument out of tune. The tightening here, and the loosening there of a string, the proper placing of a wedge or pin as required, until each note and chord in the gamut rings true.

Mental disorders, confusion, including both intellectual and emotional, perturbations, fears, disquietude, doubts, anxieties and moral shock should receive special attention. These will shed light upon two sets of facts: First, what a patient thinks of his own condition, and second, his capacity of adjustment to his environment. A confused or distorted mind must have help—skilled help—and be patiently taught to raise itself above these sordid thoughts; to become its own restorer and self-regulator.

First of all, this problem presents a skein of tangled emotions, distorted imaginings, etc. These must be straightened out, self-respect restored, the proper ambitions fortified by a sane, emotional appeal, coupled with therapeutic measures carefully selected and applied.

A great difference exists between the industrial cripple and the victim of the war. We are well aware that industrial accidents seldom, if ever, *happen*—they are caused. Therefore the industrial cripple is, in the majority of cases, the cause of his own misfortune. Consequently he exerts will power and develops more recuperative force. He will make a more desperate effort to recover from his injury, train and fit himself for some employment. The war victim feels himself a hero. Well, so he is. And his rehabilitation is a debt the government should pay to the full extent.

In considering these problems (and their name is legion), it is the human interest that makes the strongest appeal.

It is a recognized fact that mortal beings should have both mental and physical work, and this work is, in proportion, just as necessary to their lives as is light, water and food. If possible, one should have work that is a veritable pleasure rather than burdensome in the least degree.

Why should a man not have a "hobby" if he so desires? One or more, so much the better. They but broaden his views and create in him a wider interest.

There is no greater "balm in Gilead" for sick minds, bodies and souls than pleasurable occupation.

Psychoneuroses—here we have the most pitiable conditions of all. They require more technical skill to successfully deal with than a Colle's fracture—not so tangible, but every whit as serious. Every effort must be made to keep the patient optimistic as to the future, and look well to his comfort. It is true he must work out his own salvation, but should not be bluntly told so, but rather must he have skilled help and advice. Tact and patience will usually put him "over the top" and win the fight.

As medical advisers, we must keep a weather eye as to our own mistakes and to those of teacher and preacher. Here again we must bring to our aid every means at our command.

Thus we see it requires a skillful skipper to hold the wheel steady, keeping his eyes firmly fixed on the safe headland of good results.

The oral cavity—here we find one of the most vital factors in the bringing back to health these victims of the war. Too much stress cannot be laid upon a thorough and exhaustive examination of the mouth—made by those who have at their command all the latest and best methods and apparatus, determining thereby, beyond all reasonable doubt, the conditions existing, and instituting an effectual treatment to eradicate all trouble thus found.

It is really startling, even now, the great number of human ills directly traceable to

bad teeth and lack of prophylaxis in the oral cavity. And many more will be found as science progresses—all caused by this much neglected organ.

One essential requirement of those dealing with the problems of rehabilitation is a patient, long-suffering disposition, and this comes with a world of meaning. These are absolutely invaluable assets in a thousand and one different ways, and can be properly classed as real psychotherapeutic forces. Next in order is a keen, technically trained perception. Without this the physician is unable to tell whether the patient is being properly dealt with. On the matter of this perception hangs success or failure. Of course, this is not the only factor making for success or failure in this work, for their name is legion, but this one is absolutely essential. Just as the experienced obstetrician, sitting in an adjoining room, can note the progress of labor by the change in tone of the patient's voice, so the medical man should be able, by use of his eyes and ears, to determine whether or not the war victim is satisfied and is putting his whole heart and energy into the process of rehabilitation. If not, then he must look to it at once. See to change of work, more encouragement, exercise in the fresh air and amusement.

"All work (or worry) and no play makes Jack a dull boy; so, too, "A little nonsense, now and then, is relished by the wisest men."

The matter of recreation and amusement is an essential problem in this work of rehabilitation. The hours for work, recreation and sleep should be arranged as best suited to the cases in hand. There are times when some of the patients cannot attend the places of amusement set apart for their own use and enjoyment. Then bring these diversions in some form or other to them, and you will note marked improvement almost immediately.

Environment is a major problem in the uplift and rehabilitation scheme. Pleasantly situated, these victims, even though the work at first selected and engaged in be not just to their liking, will make a more decided effort to overcome their disability. Then, when the change is made, to work best suited to his particular case, his progress will simply be marvelous. Many will outstrip themselves, developing latent forces and talent they never dreamed of, and never would have known they possessed had they not been in the great going "over the top" for humanity's sake. So let us "go over the top" for their sakes.

For many years the slogan of "back to the farm" has been heard all over the land. One of the greatest problems in this rehabilitation work is to interest as many of the victims of the war as possible in farming, fruit growing, trucking, etc.

There is no more healthy, clean, scientific, progressive, independent nor profitable occupation than that of forcing nature to yield an abundant harvest. Here the patient lives in the open, breathes the fresh air under the blue sky, and feasts his eyes ever and anon upon the vast and wondrous beauties of nature. By his efforts he wrests from the soil her manifold mysteries, and in truth becomes, in the fullest sense of the word, a producer. Production is the keynote to success in the solution of some of the most intricate economic problems of the age.

A knotty problem presents: handled in the ordinary way will lead to failure. I do not advocate the unusual because it is out of the ordinary, for it will only spell disaster; but, if to my mind, it seems clear that by cutting loose from precedent and attacking the problem from a particularly new angle, even at the expense of criticism and ridicule, will bring good results, then go ahead, having the power of the unusual to back you, and do what others won't or don't, and turn failure into success.

We all admit the "lure of the city." We will find many who desire to train for various lines of work that, we realize, does not suit them. Why? The answer is simple: They are longing for the lights, the

bustle and whirr of the great metropolis, and wish once again to mingle with its surging crowds and indulge in its dissipations.

There are those who will do best in the cities, just as we find those best suited to work in the small towns and in the rural districts. So the placement problem looms up as a stupendous one, vigilance being the price of success.

Medical, training and placement men should and must work together in perfect harmony, united in effort and energy, for energy is the foundation stone of fortune, the cornerstone of family happiness, the sheet-anchor of patriotism, the chief attribute of good government and, last but not least, the golden key that unlocks the treasure house of success.

There are minor problems that will arise at every turn, and they must be ready to solve them in such a manner as will add to the patient's happiness. For of all the medicines distilled in the retorts of science, happiness is the most satisfying. It adds materially to the length, breadth and depth of life.

Let everyone concerned in this grand work now being carried on by our government so perform the duties assigned them, that the nation with one accord will bear witness, "Well done, thou good and faithful servant."

For these feats (and such they are) there is no distinguished service medal, no *croix de guerre*, but simply the knowledge of duty well done. Who could wish for more?

To those who enter this work and give their best—their very best—when life is finished and they are laid to rest, may the Recording Angel, dipping her golden pen in the glowing chalice of the sun, write upon the scroll of heaven, IMMORTAL!

REVIEWS FROM CURRENT LITERATURE

UNCINARIASIS.

Smillie, Wilson G., M. D.: "A Comparison of the Number of Hookworm Ova in the Stool With the Actual Number of Hookworms Harbored by the Individual." The American Journal of Tropical Medicine, Vol. 1. No. 6, p. 389, 1921.

This paper details the comparative results of microscopic examination of stools and the test treatment method in 135 cases. It emphasizes the fact that an individual may harbor a large number of adult worms and still a specimen taken from the stool may fail to contain ova, and that a single negative result cannot be relied upon as an indication of freedom from infection.

Among the conclusions we find:

1. When the cases were considered in groups there was a definite relationship between the number of ova in the stools and the number of hookworms harbored.

2. When the cases were considered individually, a trend toward such a relationship was noticeable, although the number of ova in the stools frequently gave no trustworthy index to the number of hookworms harbored.

SPIROCHETE PALLIDA.

Lacy, George R., M. D., and Haythorn, Samuel R., M. D.: "Viability of Spirochete Pallida in Excised Tissue and Autopsy Material." The American Journal of Syphilis, Vol. 5, No. 3, p. 401, 1921.

While many articles have been written on the subject of extra genital syphilitic infections, the subject, with its possibilities, is given added force by the investigations of the writers.

Their attention was called to the subject by finding numerous actively motile organisms in the blebs and organs of a stillborn congenitally syphilitic infant that had been kept in the refrigerator twenty-six hours; these organisms inoculated into a rabbit intratesticularly produced typical syphilitic lesions.

Investigations were made both as to motility and the production of lesions in rabbits and guinea-pigs.

Positive motility was observed:

In human autopsy material forty-eight hours after death, the body having been kept in the refrigerator during this period;

In chancre, seven days after excision;

In serum exudate from chancre in sealed capillary tubes at room temperature, 121 days after collection;

In saline suspension of rabbit's testicle in sealed capillary tubes at room temperature, fifty-eight days after castration;

In rabbit's testicle at refrigerator temperature, fifty-eight days after castration.

The motility was preserved equally well at room and refrigerator temperature.

In all but three of the inoculation experiments the material was injected intratesticularly, the other three being into the vaginal mucus membrane.

Positive results were obtained in ten rabbits inoculated intratesticularly with material from autopsy or chancres within twenty-six hours of death or excision, and one other was reported as positive with a question.

The balance of the inoculations gave negative results.

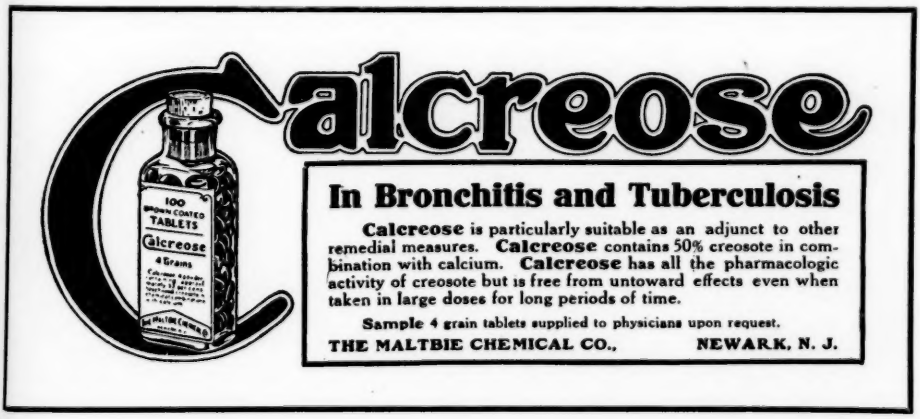
PUBLISHER'S NOTES

THE NEWER MEDICINAL CHEMICALS.

On Friday evening, January 6th, Dr. Alfred S. Burdick, president of The Abbott Laboratories, Chicago, delivered an address before the Chicago branch of the American Pharmaceutical Association on the "Newer Medicinal Chemicals." The rapid growth of American chemistry through co-operation of all research agencies in this country was emphasized by the speaker.

Concrete examples of American achievements in synthetic chemistry were recited, and a plea made for the support of the medical and pharmaceutical professions to preclude the possibility of our again becoming dependent upon foreign sources for chemical supplies. The history of arsphenamine, barbital, cinchophen, neocinchopen, chlorazene, procaine, the benzyl esters and other synthetic medicinal chemicals was outlined. Announcement was also made of a number of new chemical bodies recently developed, and others on which research work was now being done by The Rockefeller Foundation, various universities, the American Medical Association and The Abbott Laboratories.

In conclusion, Dr. Burdick urged both physicians and pharmacists to prescribe and dispense medicinal chemicals by the newer American names, rather than to perpetuate the pre-war dominance of foreign synthetics. This position was supported by the Council


Calcreose
100
TABLETS
Calcreose
4 Grains
In Bronchitis and Tuberculosis
Calcreose is particularly suitable as an adjunct to other remedial measures. Calcreose contains 50% creosote in combination with calcium. Calcreose has all the pharmacologic activity of creosote but is free from untoward effects even when taken in large doses for long periods of time.
Sample 4 grain tablets supplied to physicians upon request.
THE MALTBIE CHEMICAL CO., NEWARK, N. J.

on Pharmacy and Chemistry of the American Medical Association, in whose laboratories American medicinal products have been analyzed and found to be equal and, in some cases, superior to foreign-made products.

ADRENALIN AND P. D. & CO.

Up to 1900, the medical profession had to be content with extracts and other preparations of the suprarenal gland that contained, besides what was wanted, a good deal of inert and possibly irritating material.

One manufacturing house, at least, was engaged in making a discovery—the isolation of the active principle of the suprarenal gland, or, if it is not quite accurate to speak of it as "the active principle," the pressor or blood-pressure-raising principle of the gland. For it was known that such a principle was contained somewhere in the gland substance, from the observed effect of aqueous solutions of suprarenal extracts, and it was this principle in pure form that was wanted.

Physicians need not now be told that the manufacturing house alluded to (Parke, Davis & Co.) was successful in its quest, for Adrenalin, the pressor principle sought, has been in use by the profession since 1901.

A QUALITY SERUM.

The practical freedom from risk of anaphylaxis that attends the administration of diphtheria antitoxin and the possibility of giving an adequate number of antitoxic units in an injection of small bulk are due to the manufacturing refinements instituted by such commercial laboratories as that of Parke, Davis & Co.

The antidiphtheric serum put out by that firm is noted for high potency, the absence of non-essential proteins, and a minimum content of total solids.

REMEMBER THE ANNUAL

MEETING

JUNE 30, 1922

HAVANA, CUBA